

Primary SCIENCE	Documentation Notes
<p>Big Idea: Physical Science - Structure and Transformation of Matter REVISED 1-25-06 A basic understanding of matter is essential to the conceptual development of other big ideas in science. In the elementary years of conceptual development, students will be studying properties of matter and physical changes of matter at the macro level through direct observations, forming the foundation for subsequent learning. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.</p> <p>Academic Expectations 2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems. 2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events. 2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.</p>	<p>Note for all levels – Academic Expectation 2.1 should probably be included with all Big Ideas, since it encompasses such things as investigation, inquiry, habits of mind, scientific method, etc.</p>
<p>Enduring Knowledge – Primary Understandings <i>Students will understand that</i></p> <ul style="list-style-type: none"> • Objects are made of one or more materials, and investigating the properties of those materials helps in sorting and describing them. • Tools such as thermometers, magnifiers, rulers, and balances can give more information about objects than can be obtained by just making observations. • Things can be done to materials to change some of their properties, but not all materials respond the same way to what is done to them. • Water can be a liquid, solid, or gas and can go back and forth from one form to another. • In doing science, it is often helpful to work with a team and to share findings with others. All team members should reach their own individual conclusions, however, about what the findings mean. 	<p>AAAS <i>Atlas</i> (p.59, 61) Language from CCA narrative</p> <p>I know you want to include Nature of Science with understandings. However, the 5th bullet (from KDE example) would be repeated under all big ideas for the grade span...not sure if you want to this (repeat) - see my attempt to include under Skills & Concepts below</p>
<p>Primary Skills and Concepts <i>Students will</i></p> <ol style="list-style-type: none"> 1. use senses to observe and describe properties of material objects (color, size, shape, texture, flexibility, magnetism) 2. use appropriate tools (e.g., balance, metric ruler, thermometer, graduated cylinder) to measure and record length, width, volume, temperature, and mass of material objects and to answer questions about objects and materials 3. investigate the physical properties of water as a solid, liquid, and gas 4. classify water and other matter using one or more physical properties 5. observe and predict the properties of material objects 6. work with others to investigate questions about properties of materials, documenting and communicating observations, designs, procedures, and results 	<p>CCA includes observable proper</p> <p>Local CCA includes solid, liquid, <u>and gas</u> at this level (air and gas concepts – included grades 3-5 AAAS <i>Atlas</i>) should introduce concept of gas/air by grade 3</p> <p>investigate – Primary level should show opportunities for asking questions and testing ideas through investigation</p>

	(meaning “trying things out” at K-2 and moving to fair tests grades 3-5/ <i>Atlas</i> pp. 18-21) (DOK 3)
<p>Related KY CCA and Instructional Support Materials:</p> <p>SC-EP-1.1.1 Students will classify material objects by their properties.</p> <p>SC-EP-1.1.2 Students should understand that objects have many observable properties such as size, mass, shape, color, temperature, magnetism, and the ability to interact and/or to react with other substances. Some properties can be measured using tools such as metric rulers, balances, and thermometers.</p> <p>SC-EP-1.1.3 Students will describe the properties of water as it occurs as a solid, liquid, or gas.</p>	KDE may want to keep CCA codes as a link to CCA document

Grade 4 SCIENCE	Documentation Notes
<p>Big Idea: Physical Science - Structure and Transformation of Matter REVISED 1-25-06 A basic understanding of matter is essential to the conceptual development of other big ideas in science. In the elementary years of conceptual development, students will be studying properties of matter and physical changes of matter at the macro level through direct observations, forming the foundation for subsequent learning. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.</p> <p>Academic Expectations 2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems. 2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events. 2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.</p>	<p>Note for all levels – Academic Expectation 2.1 should probably be included with all Big Ideas, since it encompasses such things as investigation, inquiry, habits of mind, scientific method, etc.</p>
<p>Enduring Knowledge – Grade 4 Understandings <i>Students will understand that</i></p> <ul style="list-style-type: none"> • Things can be done to materials to change some of their properties, but not all materials respond the same way to what is done to them. • When a new material is made by combining two or more materials it has properties that are different from the original materials. • Heating or cooling cause changes in the properties of materials. • If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing. When liquid water disappears, it turns into a gas (vapor). • Scientists pay more attention to claims about how something works if the claims are backed up with evidence that can be confirmed. 	<p>AAAS <i>Atlas</i> (p.59, 61) Language from CCA narrative</p> <p>Resulting cause and effect relationships should be explored, described and predicted. DOK 3 <u>Underlining</u> = first time in POS (at grade 4) NAEP Science 2009</p>
<p>Grade 4 Skills and Concepts <i>Students will</i></p> <ol style="list-style-type: none"> 1. investigate and describe how the physical properties of water change as heat energy is added or removed 2. investigate ways that the properties of matter can be changed 3. predict and describe patterns of properties in matter, such as how materials will interact with each other and how they can be changed 4. design and build objects that require different properties of materials 5. write clear descriptions of their designs and experiments, present their findings (when appropriate) in tables and graphs (designed by the students) 6. investigate student-generated questions about the properties of matter and uses of matter with particular properties 7. analyze the designs and investigations of themselves and others to see if following the same procedures would produce similar results and conclusions (scientific validity) 	<p>AAAS <i>Atlas</i> investigate –opportunities for asking questions and testing ideas through investigation, including fair tests grades 3-5/<i>Atlas</i> pp. 18-21 (DOK 3)</p> <p>While not specially included in CCA for grade 4, properties of matter is included for POS</p> <p>Primary does not have “student-generated” questions, – only “answer questions” –</p>

	should all levels have “student-generated?”
Related KY CCA and Instructional Support Materials: SC-04-1.1.1 Students will explain how matter, including water, can be changed from one state to another.	KDE may want to keep CCA codes as a link to CCA document

Grade 5 SCIENCE	Documentation Notes
<p>Big Idea: Physical Science - Structure and Transformation of Matter REVISED 1-25-06 A basic understanding of matter is essential to the conceptual development of other big ideas in science. In the elementary years of conceptual development, students will be studying properties of matter and physical changes of matter at the macro level through direct observations, forming the foundation for subsequent learning. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.</p> <p>Academic Expectations 2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems. 2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events. 2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.</p>	<p>Note for all levels – Academic Expectation 2.1 should probably be included with all Big Ideas, since it encompasses such things as investigation, inquiry, habits of mind, scientific method, etc.</p>
<p>Enduring Knowledge – Grade 5 Understandings <i>Students will understand that</i></p> <ul style="list-style-type: none"> Any substance can be distinguished from any other by its unique set of properties. The physical properties of a substance do not change regardless of how much or how little of the substance there is. Many kinds of changes in the properties of substances occur faster under hotter conditions. When individual substances are combined, the total weight is equal to the sum of the individual weights. Results of investigations are seldom exactly the same, but if the results vary widely, then it is necessary to figure out why they differ. 	<p>AAAS <i>Atlas</i> (p.59, 61) Language from CCA narrative</p> <p><u>Underlining</u> = first time in POS (at grade 5)</p>
<p>Grade 5 Skills and Concepts <i>Students will</i></p> <ol style="list-style-type: none"> use appropriate tools (e.g., balance, thermometer, graduated cylinder) and observations to describe physical properties of substances (e.g., boiling point, solubility, density) and to classify materials work individually and with others to design and conduct fair tests to safely investigate properties of matter, such as boiling point, density, and solubility keep accurate records of investigations (procedures, data) in order to support or dispute conclusions utilize student-generated questions about the properties of matter to drive inquiry-based learning experiences 	<p>AAAS <i>Atlas</i> investigate –opportunities for asking questions and testing ideas through investigation, including fair tests grades 3-5/<i>Atlas</i> pp. 18-21 (DOK 3)</p> <p>Primary does not have “student-generated” questions, – only “answer questions” – should all levels have “student-generated?”</p>
<p>Related KY CCA and Instructional Support Materials: SC-05-1.1.1 Students will describe the physical properties of substances (e.g., boiling point, solubility, density). DOK 2</p>	<p>KDE may want to keep CCA codes as a link to CCA document</p>

Grade 6 SCIENCE	Documentation Notes
<p>Big Idea: Physical Science - Structure and Transformation of Matter REVISED 1-25-06</p> <p>A basic understanding of matter is essential to the conceptual development of other big ideas in science. During the middle years, physical and chemical changes in matter are observed, and students begin to relate these changes to the smaller constituents of matter—namely, atoms and molecules. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.</p> <p>Academic Expectations</p> <p>2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.</p> <p>2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.</p> <p>2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.</p> <p>2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance.</p>	
<p>Enduring Knowledge – Grade 6 Understandings</p> <p><i>Students will understand that</i></p> <ul style="list-style-type: none"> • Materials may be composed of parts that are too small to be seen without magnification. • No matter how substances within a closed system interact with one another, or how they combine or break apart, the total weight of the system remains the same. • Chemical changes result in the formation of a substance that has different properties than the original substance. • Not all substances that are mixed together will chemically combine. Because of this, physical properties can be used to separate mixtures. • New ideas in science sometimes spring from unexpected findings, and they usually lead to new investigations. 	<p>AAAS <i>Atlas</i> (p.61) Language from CCA narrative</p> <p><u>Underlining</u> = first time in POS (at grade 6)</p>
<p>Grade 6 Skills and Concepts</p> <p><i>Students will</i></p> <ol style="list-style-type: none"> 1. use hand lenses and microscopes to investigate substances composed of particles too small to be seen without magnification 2. use observations and evidence to describe and verify chemical changes in matter 3. classify changes in substances as physical or chemical changes 4. distinguish between mixtures and compounds 5. explain how or why mixtures can be separated using physical properties, and investigate strategies for separating mixtures 6. explore the feasibility of various procedures for separating mixtures, taking into account constraints such as availability and properties of materials, safety, economic and ethical issues 7. investigate how important scientific advances have resulted from unexpected observations or experimental results 8. plan, present, and support information from investigations using a variety of modes 	<p>AAAS <i>Atlas</i> pp. 17-21 inquiry = collection of relevant evidence, use of logical reasoning, to devise hypotheses & explanations; repeat to verify results; knowledge is modified as new information is revealed</p>

Literacy/Technology Connections: <i>Students will</i> Suggest including connections under Skills & Concepts where they may be more meaningful to teachers planning instruction – KDE also noted the need for context for inquiry and tech/literacy connections	
Related KY CCA and Instructional Support Materials: SC-M6 1.1.1 Students will explain how or why mixtures can be separated using physical properties. SC-06-1.1.2 Students will identify and describe evidence of chemical changes in matter.	KDE may want to keep CCA codes as a link to CCA document

Grade 7 SCIENCE	
<p>Big Idea: Physical Science - Structure and Transformation of Matter REVISED 1-25-06</p> <p>A basic understanding of matter is essential to the conceptual development of other big ideas in science. During the middle years, physical and chemical changes in matter are observed, and students begin to relate these changes to the smaller constituents of matter—namely, atoms and molecules. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.</p> <p>Academic Expectations</p> <p>2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.</p> <p>2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.</p> <p>2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.</p> <p>2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance.</p>	
<p>Enduring Knowledge – Grade 7 Understandings</p> <p><i>Students will understand that</i></p> <ul style="list-style-type: none"> • Equal volumes of different substances usually have different weights. • There are only about 100 different elements and all matter is made of some combination of them (compounds). • Elements, as well as compounds, can be classified according to their similar properties, including how they react with each other and how they may be used. The patterns which allow classification can be used to infer or understand real life applications for those substances. • Many factors influence reaction rates, such as temperature, acidity, and concentration. • Investigations are conducted for different reasons, including to explore new phenomena, to check on previous results, to test how well a theory predicts, and to compare different theories. 	<p>AAAS <i>Atlas</i> (p.61) Language from CCA narrative</p> <p><i>NAEP Science 2009 - gr 8</i></p>
<p>Grade 7 Skills and Concepts</p> <p><i>Students will</i></p> <ol style="list-style-type: none"> 1. compare the physical and chemical properties of a variety of substances, including examples of solids, liquids, and gases 2. distinguish between elements and compounds and classify them according to their properties 3. generate investigable questions and conduct experiments or non-experimental research to address them 4. observe reactions between substances that produce new substances very different from the reactants 5. test factors that influence reaction rates 6. explore real-life applications of a variety of elements and compounds and communicate findings in an authentic form (transactive writing, public speaking, multimedia presentations) 	<p><i>Includes tech & literacy connections</i></p> <p>AAAS <i>Atlas</i> pp. 17-21 inquiry = collection of relevant evidence, use of logical reasoning, to devise hypotheses & explanations; repeat to verify results; knowledge is modified as new information is revealed</p>

Related KY CCA and Instructional Support Materials: SC-07-1.1.1 Students will classify substances according to their chemical/reactive properties; infer real life applications for substances based on chemical/reactive properties. SC-07-1.1.2 Students will classify elements and compounds according to their properties; compare properties of different combinations of elements.	KDE may want to keep CCA codes as a link to CCA document
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Grade 8 SCIENCE	
<p>Big Idea: Physical Science - Structure and Transformation of Matter REVISED 1-25-06</p> <p>A basic understanding of matter is essential to the conceptual development of other big ideas in science. During the middle years, physical and chemical changes in matter are observed, and students begin to relate these changes to the smaller constituents of matter—namely, atoms and molecules. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.</p> <p>Academic Expectations</p> <p>2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.</p> <p>2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.</p> <p>2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.</p> <p>2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance.</p>	
<p>Enduring Knowledge – Grade 8 Understandings</p> <p><i>Students will understand that</i></p> <ul style="list-style-type: none"> • All matter is made of tiny moving particles called atoms, which are far too small to see directly through a microscope. The atoms of any element are alike but are different from atoms of other elements. • Because atomic structure is not directly observable, models (physical and conceptual) are used to facilitate understanding. What kind of model to use and how complex it should be depends on its purpose. • Chemical elements do not break down during normal laboratory reactions (e.g., heating, exposure to electric currents, reaction with acids). The atoms that are present today are the same atoms that have always existed. • The idea of atoms explains the conservation of matter: If the number of atoms stays the same no matter how they are rearranged, then their total mass stays the same. • There are groups of elements that have similar properties, including highly reactive metals, less-reactive metals, highly reactive nonmetals (such as chlorine, fluorine, and oxygen) and some almost completely non-reactive gases (such as helium and neon). Some elements don't fit into any of the categories; among them are carbon and hydrogen, essential elements of living matter. • Over a long time, matter is transferred from one organism to another repeatedly and between organisms and their physical environment. As in all material systems, the total amount of matter remains constant, even though its form and location change. 	<p>AAAS <i>Atlas</i> (p.61) Language from CCA narrative</p> <p>NAEP <i>Science 2009</i> - gr 8 (but more detail on metals and acids as examples of classifications)</p> <p>NAEP <i>Science 2009</i> - gr 12 and NSES grades 9-12 – should the POS include content (even if supporting CCA states it) that most national sources include for grades 9-12? We should discuss how to achieve a balance of these concepts between grade 8 and high school grades</p>
<p>Grade 8 Skills and Concepts</p> <p><i>Students will</i></p> <ol style="list-style-type: none"> 1. classify substances by how they react in given situations 2. analyze models/representations of elements and basic atomic structure 3. describe and illustrate the movement of elements between organisms and their physical 	<p><i>Includes tech & literacy connections</i></p> <p>AAAS <i>Atlas</i> pp. 17-21 inquiry =</p>

<p>environment, and within the earth system.</p> <ol style="list-style-type: none">analyze factors that may influence the movement of elements among the solid earth, oceans, atmosphere and organisms.investigate the relationship between the seemingly indestructible nature of the atom and the concept of conservation of matter	<p>collection of relevant evidence, use of logical reasoning, to devise hypotheses & explanations; repeat to verify results; knowledge is modified as new information is revealed</p>
<p>Related KY CCA and Instructional Support Materials:</p> <p>SC-08-1.1.1 Students will interpret models/representations of elements; classify elements based upon patterns in their physical (e.g., density, boiling point, solubility) and chemical (e.g., flammability, reactivity) properties.</p> <p><i>SC-08-1.1.2 Students will understand that matter is made of minute particles called atoms, and atoms are composed of even smaller components. The components of an atom have measurable properties such as mass and electrical charge. Each atom has a positively charged nucleus surrounded by negatively charged electrons. The electric force between the nucleus and the electrons holds the atom together.</i></p> <p><i>SC-08-1.1.3 Students will understand that the atom's nucleus is composed of protons and neutrons that are much more massive than electrons. When an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element.</i></p> <p>SC-08-1.1.4 Students will describe interactions which cause the movement of each element among the solid Earth, oceans, atmosphere, and organisms (biogeochemical cycles).</p>	<p>KDE may want to keep CCA codes as a link to CCA document</p>

High School SCIENCE	
<p>Big Idea: Physical Science - Structure and Transformation of Matter REVISED 1-25-06</p> <p>A basic understanding of matter is essential to the conceptual development of other big ideas in science. By high school, students will be dealing with evidence from both direct and indirect observations (microscopic level and smaller) to consider theories related to change and conservation of matter. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.</p> <p>Academic Expectations</p> <p>2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.</p> <p>2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.</p> <p>2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.</p> <p>2.5 Students understand that under certain conditions nature tends to remain the same or move toward a balance.</p>	
<p>Enduring Knowledge – High School Understandings</p> <p><i>Students will understand that</i></p> <ul style="list-style-type: none"> • The configuration of atoms in a molecule determines the molecule's properties. Shapes are particularly important in how large molecules interact with others. • An enormous variety of biological, chemical, and physical phenomena can be explained by changes in the arrangement and motion of atoms and molecules. • When elements are listed in order by the masses of their atoms, the same sequence of properties appears over and over again in the list. The periodic table is a consequence of the repeating pattern of outermost electrons. • Isotopes of an element vary in their number of neutrons, and may vary in their stability. • Solids, liquids, and gases differ in the distances between molecules or atoms and therefore in the strength of the forces of attraction that binds them together. • Chemical compounds are formed when two or more atoms bond with each other. Bonding involves only the outer electrons of the atoms, and some atoms may lose or gain electrons (ions). • Rates of chemical reactions vary. Reaction rates depend on concentration, temperature, and properties of reactants. Catalysts speed up chemical reactions. • Chemical reactions have a variety of essential real-world applications, such as oxidation and various metabolic processes. • Materials vary in their ability to conduct electricity, depending on their composition and their temperature. • A system may stay the same because nothing is happening or because things are happening but exactly counterbalance one another. • Accurate record-keeping, openness, and replication are essential for maintaining credibility with other scientists and society. 	<p>AAAS <i>Atlas</i> (p.61)</p> <p>NSES grades 9-12 pp. 178-179</p> <p>Language from CCA narrative</p> <p>NAEP <i>Science 2009</i> - gr 8</p> <p>NAEP <i>Science 2009</i> - gr 12</p>

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<p>High School Skills and Concepts <i>Students will</i></p> <ol style="list-style-type: none"> classify samples of matter from everyday life as being elements, compounds, or mixtures Investigate the kinetic molecular theory of matter construct and/or interpret diagrams that illustrate ionic and covalent bonding predict compound formation and bond type as either ionic or covalent identify and test variables that affect reaction rates utilize evidence/data from chemical reactions to predict the effects of changes in variables (concentration, temperature, properties of reactants, surface area, and catalysts) explore the relationships among temperature, particle number, pressure, and volume in the Universal Gas Law explain the organizational structure (design) and communicate the usefulness of the Periodic Table to determine potential combinations of elements investigate the role of intermolecular or intramolecular interactions on the physical properties (solubility, density, polarity, boiling/melting points) of compounds relate the chemical behavior of an element, including bonding, to its location on the periodic table relate the structure of water to its function as the universal solvent design and conduct experiments to determine the conductivity of various materials create and/or interpret graphs and equations to depict and analyze patterns of change explore real-life applications of a variety of chemical reactions (e.g., acids and bases, oxidation, rusting, tarnishing) and communicate findings/present evidence in an authentic form (transactive writing, public speaking, multimedia presentations) generate investigable questions and conduct experiments or non-experimental research to address them, using evidence to defend conclusions 	<p>Includes tech & literacy connections</p> <p><i>AAAS Atlas</i> pp. 17-21 inquiry = collection of relevant evidence, use of logical reasoning, to devise hypotheses & explanations; repeat to verify results; knowledge is modified as new information is revealed (theories)</p>
<p>Related KY CCA and Instructional Support Materials: SC-HS-1.1.1 Students will classify or make generalizations about elements from data of observed patterns in atomic structure and/or position on the periodic table. <i>SC-HS-1.1.2 Students will understand that the atom's nucleus is composed of protons and neutrons that are much more massive than electrons. When an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element.</i> <i>SC-HS-1.1.3 Students will understand that solids, liquids, and gases differ in the distances between molecules or atoms and therefore the energy that binds them together. In solids, the structure is nearly rigid; in liquids, molecules or atoms move around each other but do not move apart; and in gases, molecules or atoms move almost independently of each other and are relatively far apart.</i> <i>SC-HS-1.1.4 Students will understand that in conducting materials, electrons flow easily; whereas, in insulating materials, they can hardly flow at all. Semiconducting materials have intermediate behavior. At low</i></p>	<p>KDE may want to keep CCA codes as a link to CCA document</p>

<p><i>temperatures, some materials become superconductors and offer no resistance to the flow of electrons.</i></p> <p>SC-HS-1.1.5 Students will explain the role of intermolecular or intramolecular interactions on the physical properties (solubility, density, polarity, boiling/melting points) of compounds.</p> <p>SC-HS-1.1.6 Students will identify variables that affect reaction rates; predict effects of changes in variables (concentration, temperature, properties of reactants, surface area, and catalysts) based on evidence/data from chemical reactions.</p> <p>SC-HS-1.1.7 Students will construct diagrams to illustrate ionic or covalent bonding; predict compound formation and bond type as either ionic or covalent (polar, nonpolar).</p> <p>SC-HS-1.1.8 Students will explain the importance of chemical reactions in a real-world context; justify conclusions using evidence/data from chemical reactions.</p>	
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